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EXAMINER	
CHU, KIM KWOK	

ART UNIT	PAPER NUMBER
2627	

DATE MAILED: 12/13/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/600,637	HAYNER ET AL.	
	Examiner	Art Unit	
	Kim-Kwok CHU	2627	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *Amendment filed on 9/29/2006*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-17 and 21-37* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-17 and 21-37* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *20 June 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

Response to Remarks

1. Applicant's Amendment filed on September 29, 2006 has been fully considered but it is not persuasive.

With respect to the rejected Claim 1, the amended feature "to reduce signal cross-coupling" can be considered as a noises/errors reducing operation for preventing a signal's disturbances effect. In fact, Applicant teaches an error correction method for a servo signal such as a focusing signal (section 21). Similarly, the cited prior art of Ikeda teaches this feature as illustrated in Fig. 4. where an actuator 16 is controlled by a gain/phase adjusted servo signal. In other words, a servo signal inherently has the property of Applicant's claimed feature "to reduce signal cross-coupling".

With respect to Claim 13, Applicant states that it has been amended (page 13 of the Remarks, lines 10-13). However, Claim 13 is presented in the original form and therefore the original rejection is maintained.

With respect to Claims 21, 23, 26 and 31, the original rejection with prior art of Ikdeda is maintained because of Ikeda's servo signal inherently has the properties of the amended features such as "reducing signal cross-coupling" and "providing with decoupling compensation signal".

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. § 102 that form the basis for the rejections under this section made in this Office action:

> *A person shall be entitled to a patent unless--*
> *(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.*

3. Claims 1-12 and 21-37 are rejected under 35 U.S.C. § 102(b) as being anticipated by Ikeda et al. (U.S. Patent 5,970,032).

4. Ikeda teaches a disk servo control method having all of the steps as recited in claims 1-12. For example, Ikeda teaches the following:

(a) with respect to Claim 1, receiving a first control signal (track servo) to facilitate implementation of a function of a first actuator 208 of an optical pickup unit 118 (Figs. 3A, 3B and 5; step 1 seeking for designated track); receiving a second control signal (focus servo) to facilitate implementation of a function of a second actuator 210 of the optical pickup 118 (Figs. 3A, 3B and 5; step 2); determining a first modified control signal (tracking servo) based upon the first control signal and the second control signal (Fig. 3A; tracking servo is constantly modified based on previous tracking and focusing

conditions); wherein the first modified control signal facilitates decoupling (stopping) the second actuator from the first actuator by reducing signal cross-coupling (Figs. 3A and 5; either tracking or focusing is stopped during a disk servo activity; a servo signal inherently has the property of reducing signal cross-coupling).

(b) with respect to Claim 2, determining a second modified control signal (focus servo) based upon the first control signal (tracking servo) and the second control signal (focus servo), wherein the second modified control signal facilitates decoupling the first actuator TC from the second actuator FC (Figs. 3A and 5; focus servo is constantly modified based on previous tracking and focusing conditions; proper focusing will stop tracking operation).

(c) with respect to Claim 3, the first actuator comprises a tracking actuator 124 of the optical pickup (Fig. 3B).

(d) with respect to Claim 4, the second actuator 126 comprises a focus actuator of the optical pickup (Fig. 3B).

(e) with respect to Claim 5, receiving a third control signal to facilitate implementation of a function of a third actuator (carriage servo 150) of the optical pickup (Fig. 3A and 3B; coarse tracking actuator is an inherent means); determining the first modified control signal based upon the first control signal, the second control signal

and the third control signal, wherein the first modified control signal facilitates decoupling the first actuator from the second actuator and the third actuator (Figs. 3A, 3B and 5; coarse tracking is included in the seek servo controller 172).

(f) with respect to Claim 6, the first actuator comprises a fine tracking actuator 124 and the third actuator comprises a gross tracking actuator 150 (Fig. 3A; carriage servo is the coarse tracking).

(g) with respect to Claim 7, determining the second modified control signal based upon the second control signal, the first control signal and the third control signal, wherein the second modified control signal facilitates decoupling the second actuator from the first actuator and the third actuator (Figs. 3A and 5; either tracking or focusing is stopped during a disk servo activity).

(h) with respect to Claim 8, determining the first modified control signal (tracking servo) further comprises generating a difference signal and modifying the first control signal according to the difference signal and a control law (Figs. 3A and 11; tracking seeking requires difference signals such as offset values).

(i) with respect to Claim 9, determining the first modified control signal further comprises determining

(processing) the first modified control signal (tracking servo) prior to input to an actuator driver (Fig. 3A).

(j) with respect to Claim 10, determining the first modified control signal (tracking servo) further comprises modifying the second control signal (focus servo) by a linear value (sampling rate) to create a modifier (sampling) and modifying the first control signal by the modifier (Fig. 3A; sampling the tracking signal in order to obtain tracking servo).

(k) with respect to Claim 11, determining the first modified control signal (tracking servo) further comprises modifying the second control signal (focus servo) by a specific process (digital processing) to create a modifier (sampling rate) and modifying the first control signal (tracking servo) by the modifier (Fig. 3A; focusing and servo processing have the same sampling rate).

(l) with respect to Claim 12, receiving a first position signal sensed by a first sensor (photodetector is a first sensor) of the OPU wherein the first control signal is based on the first position signal (Fig. 3A; fine tracking); receiving a second position (focusing servo) signal sensed by a second sensor (focusing sensor) of the optical pickup wherein the second control signal is based on the second position signal (Fig. 3B).

5. Claims 21 and 22 have limitations similar to those treated in the above rejection, and are met by the reference as discussed above.

6. Claims 23-25 have limitations similar to those treated in the above rejection, and are met by the reference as discussed above. Claim 23 however also recites the following limitations which are also disclosed by the prior art of Ikeda:

(a) with respect to Claim 23, wherein the focus control loop and the tracking control loop are cross-coupled (Fig. 3A; loop signals are cross coupled connections).

7. Claims 26-30 have limitations similar to those treated in the above rejection, and are met by the reference as discussed above. Claim 26 however also recites the following limitations which are also disclosed by the prior art of Ikeda:

(a) with respect to Claim 26, determining cross-coupling characteristics of a focus actuator and a tracking actuator of an optical pickup unit (Fig. 3A; servo loop characteristics is the cross-coupling characteristics); determining a decoupling matrix to decouple the focus actuator and the tracking actuator (Fig. 3A; DSP 140 and

servo processor 142 include de-coupling matrix of tracking and focusing).

8. Claims 31-35 have limitations similar to those treated in the above rejection, and are met by the reference as discussed above. Claims 32-35 however also recite the following limitations which are also disclosed by the prior art of Ikeda:

(a) with respect to Claim 32, the decoupler (servo operation) modifies a focus command to have a reduced effect on a tracking position of the lens assembly and modifies a tracking command to have a reduced effect on a focus position of the lens assembly (Figs. 3A and 3B; a reduced effect such as an error effect).

(b) with respect to Claim 33, the decoupler is a software routine stored on computer readable media (Figs. 3A, 3B and 10 (Figs. 3A and 3B; servo operation is written in the software such as seek to test zone as illustrated in Fig. 5, step S1).

(c) with respect to Claim 34, the decoupler is an analog circuit (Fig. 3A; servo processing 142 includes analog circuit).

(d) with respect to Claim 35, the decoupler is an electro-mechanical circuit (Fig. 3B; actuator 124 and 126 are electro-mechanical circuit).

9. Claims 36 and 37 have limitations similar to those treated in the above rejection, and are met by the reference as discussed above. Claim 36 however also recites the following limitations which are also disclosed by the prior art of Ikeda:

(a) with respect to Claim 36, determining cross-coupling characteristics of a focus actuator and a tracking actuator of an optical pickup unit (Fig. 3A; servo loop characteristics is the cross-coupling characteristics); determining a decoupling matrix to decouple the focus actuator and the tracking actuator (Fig. 3A; DSP 140 and servo processor 142 include de-coupling matrix of tracking and focusing).

10. Claims 13-17 are rejected under 35 U.S.C. § 102(b) as being anticipated by Ikeda et al. (U.S. Patent 5,970,032).

Ikeda teaches a disk servo control method having all of the steps as recited in claims 13-17. For example, Ikeda teaches the following:

(a) with respect to Claim 13, a first component (focusing) comprising a first component input and a first component output (Figs. 3A and 3B); a second component (tracking) comprising a second component input and a second component output (Figs. 3A and 3B); a first component control law (focusing servo 164) portion comprising an input coupled to the first component output and an output (Fig. 3A); a second component control law (tracking servo 158) portion comprising an input coupled to the second component output, and an output (Fig. 3A); a first component decoupler 142 configured to decouple the first component from the second component (Fig. 3A; servo processing means 142 is a coupling and decoupling means); the decoupler 142 comprising a first input coupled to the first component output and a second input coupled to the second component output, and an output coupled to the first component input (Fig. 3A; servo processor 142 has input and output means connected to all its components inside); a second component decoupler (in 142) configured to decouple the second component from the first component, comprising a first input coupled to the

first component output and a second input coupled to the second component output, and an output coupled to the second component input (Fig. 3A; servo processor 142 has input and output means connected to all its components inside).

(b) with respect to Claim 14, the first component comprises a focus actuator 126 and the second component comprises a tracking actuator 124 (Fig. 3B).

(c) with respect to Claim 15, the first component comprises a focus sensor 128 and the second component comprises a tracking sensor 132 (Fig. 3B).

(d) with respect to Claim 16, the first component control law (focusing servo) portion 158 and the first component decoupler are integrated onto an information processing device 142 (Fig. 3A).

(e) with respect to Claim 17, the first component decoupler is integrated onto an actuator driver 210 (Fig. 3A; DSP 140 and drivers and integrated in a circuit board).

11. ***THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).***

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action

12. Any inquiry concerning this communication or earlier communication from the examiner should be directed to Kim CHU whose telephone number is (571) 272-7585 between 9:30 am to 6:00 pm, Monday to Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Andrea Wellington, can be reached on (571) 272-4483.

The fax number for the organization where this application or proceeding is assigned is (571) 273-8300

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished application is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9191 (toll free).

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December 8, 2006
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12/8/2006

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SUPERVISORY PATENT EXAMINER